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Case Report

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Abnormal lesion that can be confused with medial meniscal tears, medial meniscocapsular band: a rare presentation

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ABSTRACT

This case report describes a meniscocapsular band, a structure extending from the medial capsule of the knee joint to the corpus of the medial meniscus, observed during arthroscopy in a 48-year-old woman. Preoperative physical examination findings were compatible with medial meniscal pathology only; magnetic resonance imaging showed an abnormal medial meniscus and was interpreted in favor of a tear. Arthroscopic examination showed an abnormal band inside the knee. This anatomical lesion is quite rare and similar lesions have been reported in the literature, but the extension of the band in our case is different from the extension in the cases seen in the literature. We believe that the identification of abnormal meniscal types or intra-articular bands is necessary to provide greater accuracy in MR imaging reporting.

Keywords: Arthroscopy, meniscocapsular bant, variation, meniscus

INTRODUCTION

Menisci are fibrocartilage, crescent-shaped, triangular cross-sectional structures located lateral and medial to the knee. They provide articulation between the concave femoral articular surface and the flat tibial plateau surfaces. They cover approximately 2/3 of the tibial plateau.[1,2] The menisci are connected to the tibia by coronary (meniscotibial) ligaments. The coronary ligaments are composed of capsular fibers; proximally they attach to the outer edges of the menisci and distally to the tibial condyles. The coronary ligaments attach to the tibial condyles a few mm below the articular surface, forming a synovial space.[3] The medial meniscus is C-shaped and occupies approximately 60% of the medial tibial plateau joint contact area.[4] Its posterior horn is wider than the anterior horn; it becomes progressively smaller from posterior to anterior and its anteroposterior diameter is larger than its medial lateral diameter. The medial meniscus is divided into five regions according to some anatomical features: anterior root region, anteromedial region, medial region, posterior region, posterior root region.[5]

Meniscal tears are more common in men than in women, although studies have reported different rates (2.5-4:1).[6] Both lateral and medial meniscal tears often involve the posterior horns; tears in the anterior horns are usually extensions of the posterior tears. Diagnosed isolated tears are three times more common on the medial side than the lateral. They usually occur after a severe rotational trauma, are in the vertical plane, and run longitudinally or obliquely.[6]

Magnetic resonance imaging (MRI) is one of the most commonly used methods for the diagnosis of meniscal tears. In various studies, the accuracy rate of MR in the diagnosis of meniscal lesions has been reported to be 65-99%.[7,8] Although the literature suggests that the use of PD (Proton Density) sequence is more useful than T2-a in the evaluation of meniscal tears, it has been reported that coronal T2-a images have a higher accuracy rate than PD in the evaluation of medial meniscal root tears. Therefore, all available sequences and images should be evaluated together in knee MRI. [8]

Meniscal tears or extrusions result in a larger direct contact area between the articular cartilage of the medial femoral condyle and the tibial plateau, increasing the risk of articular cartilage damage in the medial femorotibial compartment and thus causing or accelerating degenerative knee joint disease. Recent studies have observed a hypointense band extending in a slightly oblique transverse course between the medial femoral condyle and the anteromedial joint capsule overlying the anterior horn of the medial meniscus in cases of medial meniscal extrusion on MRI.[9] A band extending in a similar pattern but with different origo and insertion sites was observed in our case. Since the origo and insertion areas are different, these variations, which were confused with MCL (especially the deep branch) ruptures in the present study, showed an MR image finding that was confused with a medial meniscal tear in our case (**Figure 1**). In the arthroscopic examination of a patient with a preliminary diagnosis of medial meniscal tear, we observed an abnormal band-like structure in the area considered to be a meniscal tear on MR imaging (**Figure 2**). We hypothesized that it developed due to chronic instability in the knee. This hypothetical mechanism needs to be confirmed by biomechanical analysis.

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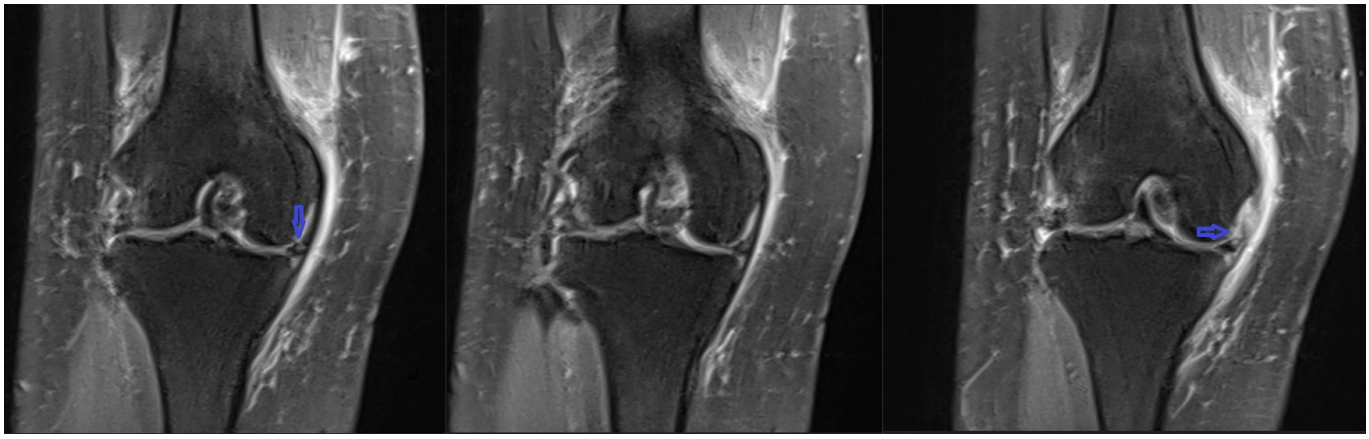

Figure 1. Abnormal band image (blue arrow) in the anteromedial region of the medial meniscus in the coronal planes on MR imaging, giving an appearance confusing with a meniscal tear.

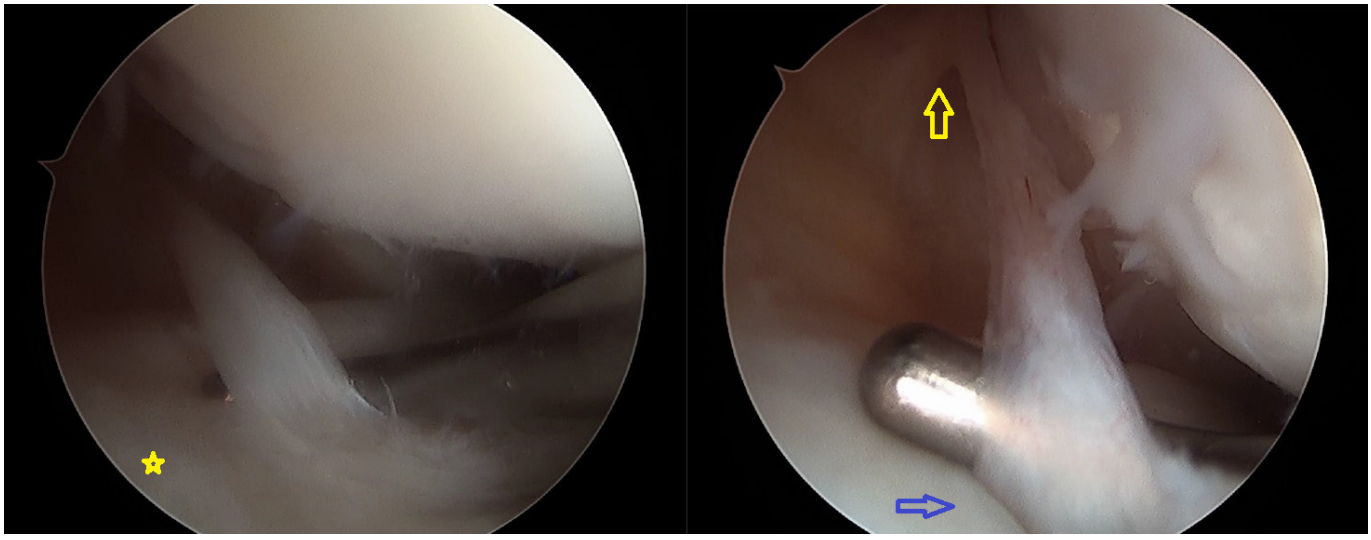

Figure 2. Arthroscopic knee joint medial compartment examination showing the appearance of an abnormal band from the medial capsule (yellow arrow) to the anteromedial region (blue arrow) of the medial meniscus (yellow star).

CASE

A 48-year-old woman was admitted to our service with complaints of right knee pain and click sound with movement for two years. There was no history of trauma. Physical examination confirmed effusion in the knee joint. Although there was pain in the last 30° flexion, range of motion imaging showed bone marrow edema consistent with contusion in the medial condyle of the femur. Articular cartilage was intact. There was pain in the medial joint line on palpation and Mc Murray test was positive. X-ray showed osteoarthrosis of the medial tibiofemoral and patellofemoral joint space. There was a 1 cm × 2 cm diameter Outerbridge stage 3 chondral defect in the medial femoral condyle related to magnetic resonance thickness and signal intensity of the right knee. There was effusion in the prepatellar bursa, suprapatellar bursa, hoffa and joint space. There is bone marrow edema in the medial condyle of the tibia consistent with contusion. The ACL, PCL, MCL and LCL structures preserved their continuity, formation and signal intensities. The lateral meniscus was normal and no tear was observed. A horizontal tear was observed in the medial meniscal corpus. Since conservative treatment was unsuccessful, we decided to apply arthroscopic surgery. Arthroscopic examination of the right knee confirmed a 1 cm×2 cm diameter Outerbridge stage 3 chondral defect in the medial femoral condyle. ACL and posterior cruciate ligament (PCL) were intact. No pathology was detected in the lateral joint. Examination of the medial compartment confirmed a band starting from the medial capsule and progressing obliquely to the white-white zone in the anteromedial region of the medial meniscus, which was very tightly attached to this region of the meniscus. No tear in the medial meniscus other than this band was detected on arthroscopic examination. This variant lesion in the medial compartment of the patient was excised by arthroscopic resection. The mensicus tissue was shaved. A 1 cm×2 cm diameter Outerbridge stage 3 chondral defect in the medial femoral condyle was intervened with the micro-fracture technique. The surgical operation was terminated. In the postoperative follow-up, our patient achieved a rapid recovery and full return to daily activity after both resection of the abnormal meniscocapsular band and arthroscopic debridement and microfracture technique of the grade 3 cartilage lesion.

DISCUSSION

A three-layered configuration of the medial capsular and supporting soft tissue structures of the knee was first proposed by Warren and Marshall, according to which layer 1 consists of the deep crural fascia; layer 2, the superficial MCL; and layer 3, the knee joint capsule, the deep MCL (meniscofemoral and meniscotibial extensions) and the patellomeniscal ligament.[10] The latest edition of Gray's Anatomy describes "fibers" in layer 3 that are sent from the capsule to the "medial meniscus".[11] Apart from this textbook information, no other study in the literature has been found regarding a meniscocapsular band in such a medial compartment.

In 2000, Lee and Min reported 2 Korean patients (3 knees). They found abnormal lateral meniscal structures on arthroscopy. They named their findings as abnormal lateral meniscal band. In both cases, the abnormal band was thin, snake-shaped and narrower than the underlying native lateral meniscus. The abnormal band showed peripheral attachments to the posterior horn and middle segment of the underlying normal lateral meniscus, but the intervening segment of the accessory meniscus was free and unrelated to the underlying true lateral meniscus. Arthroscopic resection resulted in symptomatic improvement in all cases.[12]

Our case illustrates an interesting abnormal band that has not been previously described in the literature. In our case report, both resection of the abnormal meniscocapsular band and arthroscopic debridement and microfracture of the grade 3 cartilage lesion resulted in a rapid recovery and full return to daily activity. However, it is unclear whether this improvement was due to resection of the abnormal meniscocapsular band or arthroscopic debridement and microfracture technique of the cartilage lesion.

The found in studies in the literature have mostly described variations that are confused with or resemble the deep MCL structure.[9] The reason for this is that the meniscal attachment of the bands in these studies is from the capsular region. In our case, the preoperative MR image of our case is more likely to be confused with a medial meniscal corpus tear because this connection is more from the white-white zone of the meniscus.

In our study, we showed that it is possible to identify abnormal meniscocapsular band patterns on MRI. This may raise the question of whether radiographically identifiable but clinically silent meniscal anomalies require surgical debridement. To our knowledge, no study has followed the natural history of clinically silent meniscal variations or abnormal bands. However, in the absence of direct chondral damage resulting from abnormal meniscocapsular band patterns, it is reasonable to follow such incidental findings conservatively. If another associated pathology requires surgical intervention, resection of the abnormal tissue may make sense, given the possibility of subsequent chondral injury.

CONCLUSION

Finally, a previously undescribed meniscocapsular band was described in this case report and this structure is confused with a meniscal tear on preoperative MR imaging. If such abnormal bands are detected in arthroscopic examinations, we recommend resection of the abnormal band, considering the possibility of chondral injury.

ETHICAL DECLARATIONS

Informed Consent

All patients signed the free and informed consent form.

Referee Evaluation Process

Externally peer-reviewed.

Conflict of Interest Statement

The authors have no conflicts of interest to declare.

Financial Disclosure

The authors declared that this study has received no financial support.

Author Contributions

All of the authors declare that they have all participated in the design, execution, and analysis of the paper, and that they have approved the final version.

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